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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/666,542

09/19/2003

Thomas R. Apel

TRQ-12923

5554

7590

05/12/2009

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EXAMINER

SHINGLETON, MICHAEL B

ART UNIT

PAPER NUMBER

2815

MAIL DATE

DELIVERY MODE

05/12/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/666,542	<b>Applicant(s)</b> APEL, THOMAS R.	
	<b>Examiner</b> Michael B. Shingleton	<b>Art Unit</b> 2815	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 January 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7-17 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-17 and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION*****Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. 5,162,756 (Taniguchi) in view of Holt and Apel US 6,894,561 (Apel).

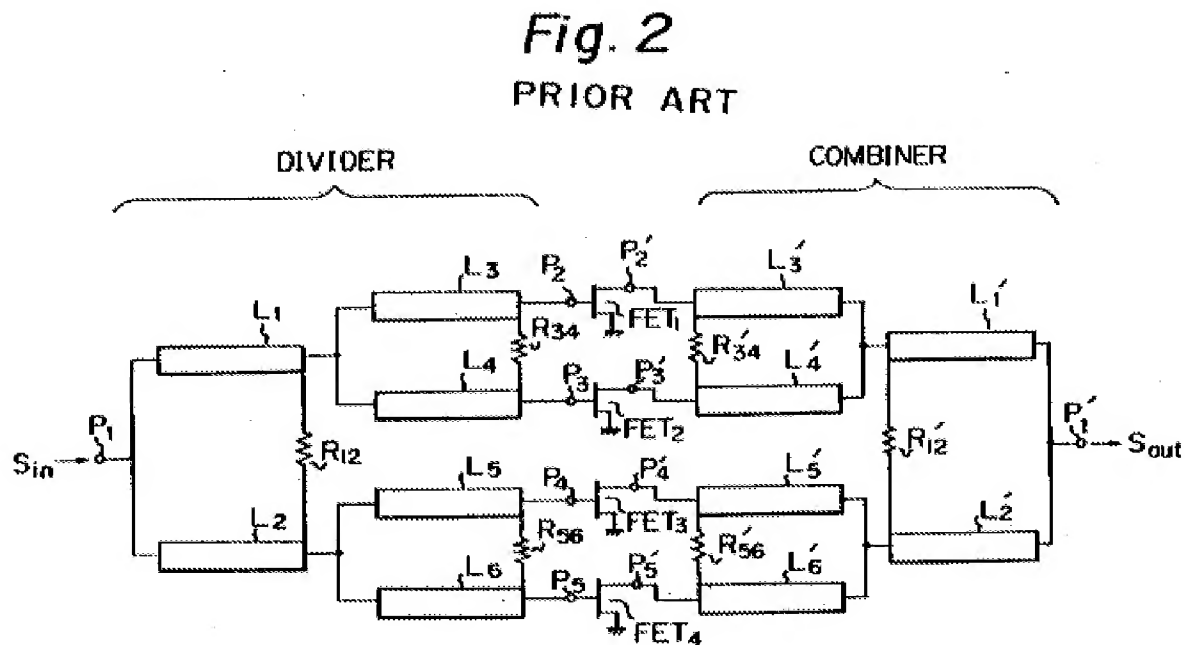


Figure 2 (Taniguchi)

Figure 2 of Taniguchi discloses a power amplifier circuit. Note that the goal of these circuits of Taniguchi is to “obtain a high power high frequency signal” (See column 3, around line 59) and thus these circuits are power amplifier circuits. Taniguchi includes a first amplifier “subsection”  $L_3$  and  $FET_1$

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(Herein and throughout referred to just as the first amplifier.) that is configured to receive an input signal that is the unmarked signal at the node that directly connects elements  $L_1$ ,  $L_3$ , and  $L_4$ . Note that the first amplifier receives this signal through element  $L_3$ . This is only giving the broadest reasonable interpretation to the claims consistent with the specification. See MPEP 904.01. The first amplifier clearly provides a “first” output signal. Element  $L_4$  of Taniguchi is a first delay element that introduces a delay to the input signal and applies this to the input of a “second” amplifier “subsection”  $FET_2$  (Herein and throughout referred to just as the second amplifier.). This second amplifier clearly has an output signal and provides a “first” delayed output signal to the node directly connecting elements  $L_3'$ ,  $L_4'$  and  $L_1'$ . The top of page 9, of applicant’s specification clearly sets forth that an impedance inverter can be a quarter wavelength transmission line. Thus all the quarter wavelength lines of Taniguchi are “impedance inverters” as set forth by applicant and is in accordance with applicant’s application. These impedance inverters of Taniguchi are in accordance with applicant’s specification provides the “impedance inversion”. Thus the impedance/delay element  $L_3'$  also introduces a second delay to the first output signal thereby creating a second delayed output signal. The node directly connecting elements  $L_3'$ ,  $L_4'$  and  $L_1'$  and the node directly connecting elements  $L_5'$ ,  $L_6'$  and  $L_2'$  in combination with the node that directly connects elements  $L_1'$  and  $L_2'$  provides the means for combining the first and second delayed output signals that ultimately provides the high frequency amplified output signal  $S_{out}$ . This output signal is provided on the output terminal “ $P_1$ ”. Taniguchi is silent on showing the bias circuit and supply circuit or what applicant calls “level control circuit” in claims like claim 1 for example that biases the first and second amplifiers to operate in the saturation range, i.e. non-linear classes of operation. Applicant should note that while Taniguchi is silent on the bias circuit or “level control circuit”. As is known to those of ordinary skill in the art, Taniguchi inherently must have a bias circuit and power supply circuit because this is a necessary circuit needed so that the amplifier(s) can operate.

The structure indicated above clearly provides for the claimed method of the claims indicated at the beginning of this rejection except for as indicated above Taniguchi is silent on providing a bias control circuit/level control circuit that biases the amplifiers such that non-linear operation is obtained.

Holt teaches that it is well known to provide a bias circuit and power supply circuit so that the amplifier can operate, i.e. amplify and to choose the bias level, so that a non-linear operation is obtained. Note that if a bipolar is used the power supply would be to the collector. Nonlinear operation results in the more efficient use of a amplifier for the transistor is not on all the time, Thus, the selection of the class of operation is merely the selection of a result effective variable that determines the energy consumption of the amplifier.

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Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide Taniguchi with a bias control circuit(s)/power supply circuits that biases and supplies power to the first and second amplifiers such that non-linear operation is obtained for these amplifiers because, as the reference is silent on the exact biasing/power supply circuit one of ordinary skill in the art would have been motivated to use any conventional art recognized equivalent biasing circuit and power supply circuit therewith such as non-linear biasing/power supply arrangements of Holt. In addition, one of ordinary skill would have been motivated to do so because providing a bias circuit to cause operation in the non-linear region has the added advantage of providing the most energy efficient amplification of the input signal as taught by Holt.

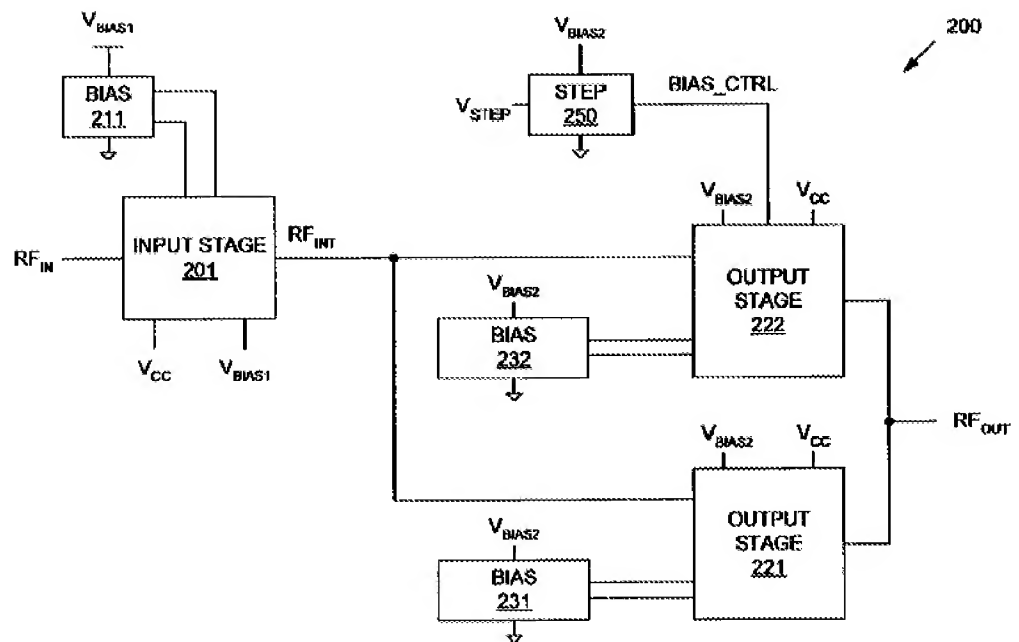


FIG. 2

Figure 2(Apel)

Figure 2 of Apel teaches one way to have a multi-channel amplifier arrangement provide for low power and high power modes. This includes the providing of a “bias control circuit” 231, 232, 250 that enables the first amplifier 221 when the “level control signal”  $V_{STEP}$  is set for a low power mode and which enables the second amplifier 222 when the “level control signal” is set for a high power mode.

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Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the combination of Taniguchi and Holt with a bias control circuitry such as that of Apel so as to enable the first amplifier during a low power mode indicated by a level control signal and enable both the first and second amplifiers when the level control signal indicates a high power mode. Therefore the multi-channel amplifier arrangement can be made to provide more than one power level output mode as taught by Apel.

Note that the selection of the bias points of the bias circuits in the combination of Taniguchi, Holt and Apel results in the level control circuit, i.e. the unshown circuit that provides the level control signal  $V_{STEP}$ , to allow for the level control circuit to cause the first and second amplifiers to operate in the saturation mode when these amplifiers are enabled.

With respect to claims like claims 11 and 12 the delay circuits of Taniguchi are quarter wavelength lines. It is well known in the art that a delay line can be composed of an inductor and one or more capacitors. These are art-recognized equivalents. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the inductor with one or more capacitors for the transmission delay lines of Taniguchi since the examiner takes Official Notice of the equivalence of the inductor with at one or more capacitors and the transmission delay line for use in the circuitry art and the selection of any of these known equivalents to provide delay/impedance inversion would be within the level of ordinary skill in the art.

As it relates to claims like claims 13 and 18, bipolar/heterojunction elements are well known to be art recognized equivalents to that of FETs. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted bipolar transistors for the FET transistors of Taniguchi since the examiner takes Official Notice of the equivalence of the bipolar/heterojunction element and FET element for use in the circuitry art and the selection of any of these known equivalents to provide amplification would be within the level of ordinary skill in the art. Note that the step/structure of applying a first output level control signal to a collector of the first amplifier “subsection” would be an obvious consequence of the combination made obvious above.

Claims 2-4, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. 5,162,756 (Taniguchi) in view of Holt and Apel as applied to claims 1, and 11-16 above, and further in view of Cheng et al. 2002/0190790 (Cheng).

All the reasoning as applied in the rejection of claims 1, 6, and 11-16 and the following:  
Taniguchi fails to describe using the biasing arrangement to disable one or more of the amplifiers in accordance with the power level one wants to obtain and Apel is silent on the structural details i.e. the

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specific circuit structure (The switches, transistors, etc. necessary to perform the enabling and disabling of the biasing arrangement taught by Apel.).

Cheng teaches that one can selectively supply the bias voltages each of the parallel-connected amplifiers so as to control the operation of these amplifiers, i.e. whether they are on or off. This controls the amount of power delivered to the load (See page “4” paragraph numbered “[0037]”).

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the bias control circuit of Taniguchi in view of Apel and Holt so as to selectively control the bias voltages to the respective amplifiers of the arrangement thereby providing not only low and high power modes but a mode of no power wherein all the amplifying devices are disabled. One of ordinary skill would have been motivated to do so as to control the amount of output power as taught by Cheng.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, Holt, Apel and Cheng as applied to claims 2-4, 17 and 20 above, and further in view of Atwater 4,189,732 (Atwater).

Taniguchi, Holt and Cheng fail to disclose the power supply arrangement as claimed. Holt is silent on the exact power supply circuit.

The only Figure of Atwater discloses a well-known circuit for providing a power supply voltage to an amplifier. This circuit includes a transistor 12, and an inductor 33 connected in series between the power supply voltage at 10 and the amplifier 46. This provides the “right” power supply level to the amplifier without supplying excess power to the amplifier that would have to be dissipated by the amplifier (See column 4, around line 44.).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed the circuit like Atwater for each of the amplifier circuits in the combination of Taniguchi, Cheng and Holt because, as these references are silent on the exact power supply circuit one of ordinary skill in the art would have been motivated to use any art-recognized equivalent power supply circuit for the amplifiers such as the conventional power supply circuit shown by Atwater. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a power supply circuit like that of Atwater for each amplifier in the combination of Taniguchi, Cheng and Holt for one of ordinary skill in the art would have been motivated to do so as to provide a correct amount of power while preventing excess power to the amplifiers as taught by Atwater.

Note that just like in applicant’s disclosed invention the term ramp is to signify the ramping of the

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voltage when the supply voltage is supplied to the amplifier. This is caused by the inductor and thus when the power is first applied to the power supply 11 of Atwater the voltage applied to the amplifier is in the form of a ramp. Therefore it is an obvious consequence of the combination made obvious above that the first and second output level control signals are ramp signals as meant by applicant. Also note that the claimed specific inductor/transistor combinations are an obvious consequence of the above combination.

Claims 5, 7-10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, Holt and Apel as applied to claims 1 and 11-16 above, and further in view of Atwater 4,189,732 (Atwater).

Taniguchi fails to disclose the power supply arrangement as claimed. Holt is silent on the exact power supply circuit.

The only Figure of Atwater discloses a well-known circuit for providing a power supply voltage to an amplifier. This circuit includes a transistor 12, and an inductor 33 connected in series between the power supply voltage at 10 and the amplifier 46. This provides the “right” power supply level to the amplifier without supplying excess power to the amplifier that would have to be dissipated by the amplifier (See column 4, around line 44.).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed the circuit like Atwater for each of the amplifier circuits in the combination of Taniguchi and Holt because, as these references are silent on the exact power supply circuit one of ordinary skill in the art would have been motivated to use any art-recognized equivalent power supply circuit for the amplifiers such as the conventional power supply circuit shown by Atwater. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a power supply circuit like that of Atwater for each amplifier in the combination of Taniguchi and Holt for one of ordinary skill in the art would have been motivated to do so as to provide a correct amount of power while preventing excess power to the amplifiers as taught by Atwater.

Note that just like in applicant’s disclosed invention the term ramp is to signify the ramping of the voltage when the supply voltage is supplied to the amplifier. This is caused by the inductor and thus when the power is first applied to the power supply 11 of Atwater the voltage applied to the amplifier is in the form of a ramp. Therefore it is an obvious consequence of the combination made obvious above that the first and second output level control signals are ramp signals as meant by applicant. Also note that the claimed specific inductor/transistor combinations are an obvious consequence of the above combination.

### ***Response to Arguments***



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Applicant's arguments filed 1-2-2009 have been fully considered but they are not persuasive. The examiner must give the broadest reasonable interpretation to the claims and as such the examiner cannot read coupled as a direct connection without any thing intermediate.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker, can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in cursive script that reads "Michael B. Shingleton". The signature is written in dark ink and is positioned above the typed name of the examiner.

MBS  
May 11, 2008

/Michael B. Shingleton/  
Michael B Shingleton  
Primary Examiner  
Group Art Unit 2815

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